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REMARKS

Claims 1-29 are in the case and presented for reconsideration. Claims 1, 14 and 19 have been amended. The support for this Amendment can be found in the Specification, for example, Page 5, Lines 9-13; Page 12, Lines 20-24; Page 16, Lines 7-13; and Page 18, Lines 1-4. No new matter has been added.

Claims 1-3 and 14-20 have been rejected under 35 U.S.C. § 102 (b) as being anticipated by U.S. Patent 5,057,095 (Fabian). With respect to this rejection, the Examiner has stated:

Fabian '095 teach all the features of the instant invention including an apparatus for determining the disposition of an object relative to a reference frame having at least a field generator, which generates an electromagnetic field in a vicinity of an object, at least one transducer, which is fixed to the object which vibrates at a predetermined vibrational frequency and emits energy, responsive to an interaction of the electromagnetic field, at least one detector which detects the energy emitted by the transducer and generates signals in response thereto and a signal processor which receives and processes the detector signals to determine the coordinates of the object (col. 3, lines 64-68 and col. 4, lines 1-34).

Claims 4-13 and 21-29 have been rejected under 35 U.S.C. § 103 (a) as being unpatentable over Fabian in view of U.S. Patent 5,727,552 (Ryan). With respect to this rejection, the Examiner has stated:

Fabian '095 teaches all the features of the instant invention including attaching the resonant marker on a surgical implement. However, Fabian '095 does not teach the use of the marker specifically on a catheter to locate a catheter. In the same field of endeavor Ryan '552 teaches the use of similar type markers to locate a catheter (col. 2, lines 56-67 and col. 3, lines 1-5). It would have been obvious to one skilled in the art at the time that the invention was made to have used the marker as taught by Fabian '095 in the catheter as taught by Ryan '552 in order to be able to localize the catheter via use of a similar type marker. The use of multiple markers would have been an obvious modification to skilled artisans in order to use techniques such as triangulation, which are well within the knowledge of skilled artisans in order to localize and determine the orientation of a catheter of interest.

Claim 1 has been amended in order to more particularly point out that the apparatus for determining the disposition of an object relative to a reference frame according to the present invention comprises at least one field generator which generates an electromagnetic field in a

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vicinity of the object; at least one transducer which is fixed to the object and which vibrates at a predetermined vibrational frequency and emits energy responsive to an interaction of the electromagnetic field therewith; one or more detectors in a vicinity of the object which detect the energy by the transducer and generate signals in response thereto; a signal processor which receives and processes the detector signals to determine coordinates of the object wherein the signal processor calculates the position and/or orientation of the at least one transducer by determining three position vector components and three components of angular orientation; and a display for displaying the position and/or orientation of the at least one transducer.

Claim 14 has been amended in order to more particularly point out that the apparatus for determining the disposition of an object relative to a reference frame in accordance with the present invention comprises at least one field generator which generates an electromagnetic field in a vicinity of the object; a transducer fixed to the object which emits acoustic energy responsive to the electromagnetic field; one or more detectors at known positions in a vicinity of the object which detect the acoustic energy emitted by the transducer and generates signals and response thereto; a signal processor which receives and processes the detector signals to determine coordinates of the object by calculating the position and/or orientation of the transducer by determining three position vector components and three components of angular orientation; and a display for displaying the position and/or orientation of the transducer.

Claim 19 has been amended in order to more particularly point out a method for determining the disposition of an object relative to a reference frame in accordance with the present invention comprising fixing to the object a transducer which vibrates at a vibrational frequency thereof; generating an electromagnetic field in a vicinity of the object; detecting energy emitted by the transducer responsive to an interaction of the field with the transducer wherein the energy has a frequency dependent on the vibrational frequency of the transducer at one or more locations in the reference frame and generating signals responsive thereto; processing signals to determine coordinates of the object based on three vector components and three components of angular orientation; and displaying the position and/or orientation of the transducer.

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Turning now to the cited prior art references, Fabian discloses a surgical implement detector utilizing a resident marker 18 which is a dipole by generating a dipole field. Column 6, Lines 11-13. It is important to note that the Fabian system uses dipole forces and a location methodology for detecting basic orientations of the marker 18 only. These are three defined orientations identified as: "parallel orientation 50", "perpendicular orientation 52" and "vertical orientation 54". The limitations of the Fabian system are clearly highlighted in Column 7, Lines 2-15 where it states:

In the parallel orientation 50, the marker length is parallel to the plane of the coils 40 and 42. The perpendicular orientation 52 exists when the marker length is perpendicular to the plane of the coils 40 and 42. A vertical orientation 54 is presented when the marker length is perpendicular to orientations 52 and 54. Referring to FIG. 5, the perpendicular orientation 52 of the marker 18 generates a strong signal in zone 62 and a weak signal in zones 60 and 64. The parallel orientation 50 of the marker 18 generates a strong signal in zones 60 and 64, and a weak signal in zone 62. In the vertical orientation 54, the marker 18 generates little or no signal in zone 62 and no significant signal in zones 60 and 64.

Thus, it is important to note that the Fabian system is entirely incapable of calculating both the position and/or orientation of the transducer by determining three position vector components and three components of angular orientation. Moreover, Fabian lacks any disclosure, suggestion or even inference for utilizing a display in order to display the position and/or orientation of the at least one transducer.

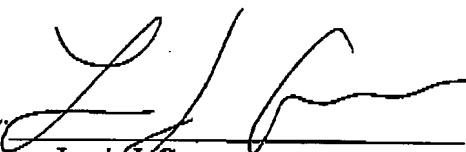
Ryan discloses a catheter and electrical lead location system utilizing a location system 20 having a loop antenna array 22 positioned outside the patient's skin 18 and an LC resonate circuit 10 in a pacing lead tip 16 which is implanted in a patient's heart. Column 4, Lines 34-67. The LC resonate circuit 10 emits a re-radiated field 32 which is picked up by the locating system antenna array 22. Column 5, Lines 5-10. The signals received from the loops of the antenna array 22 are applied to a "signal processor 34 which is referenced to a set of X, Y, Z reference plane coordinates related to the table the patient is reclining on." Column 5, Lines 17-20. It is also important to note that the location system of Ryan is only capable of determining X, Y and Z reference plane coordinates and is completely incapable of determining three components of angular orientation of the transducer.

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Therefore, neither Fabian nor Ryan, either alone or in combination with each other, describe, suggest or infer the claimed present invention as amended. Accordingly, Claim 1 (Amended), Claim 14 (Amended), and Claim 19 (Amended) as well as their respective dependent claims therefrom, are neither anticipated nor rendered obvious by the cited prior art references and favorable action is respectfully requested.

Also, enclosed please find a courtesy copy of the corrected formal drawings which are also being submitted to the Official Draftsman.

Respectfully submitted,

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